ORIGINAL ARTICLE

Implementation of outcome measurement (HoNOS) in an outpatient psychiatric clinic in Sligo/Leitrim mental health service

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Abstract

Background Routine clinical outcome monitoring (RCOM) is the standardised gathering of measures of clinical outcomes in everyday practice. HoNOS (Health of the Nation Outcome Scales) is a tool used in RCOM.

Aims To examine (a) agreement between HoNOS and Global Assessment of Functioning (GAF), (b) HoNOS changes over time/attendance and (c) clinical parameters affecting HoNOS scores.

Methods Data from outpatient clinics were collected at each contact over 2 years until June 2016 including: gender, age, diagnosis (ICD-10) and HoNOS scores. In a subsample, the GAF also were completed by community psychiatric nurses blind to HoNOS scores.

Results A number of 470 outpatients have undergone 1125 HoNOS assessments during the study period. Mean age of the attendants was 43.12; SD 14.6. Male = 220 (46.8%). Longitudinal analysis demonstrated that lower HoNOS scores are independently significantly associated to number of assessments and diagnosis in ICD-10 categories of F20–F29 (Schizophrenia, schizotypal and delusional disorders) F30–F39 (mood disorders) F40–F48 (neurotic, stress-related and somatoform disorders) and F50–F59 (behavioural disorders associated with physiological disturbances). Gender and age were not significantly associated with decline of HoNOS scores. Neither were other diagnostic categories. Agreement between HoNOS and GAF was excellent ($N = 261$, rho = -0.919, $p < 0.001$).

Conclusions This study shows that HoNOS is a feasible instrument which can be potentially used in ROCM in mental health services in Ireland and supports further the need for implementation of routine measurements in Mental Health Services. It adds longitudinal data which is lacking in similar previous studies.

Keywords HoNOS · Ireland · Outcomes · Outpatient · Psychiatry

Routine clinical outcome monitoring (RCOM) is a process by which a regularised, standardised gathering of measures of clinical outcomes occurs in everyday clinical practice. It is felt to be beneficial in aiding clinicians in tracking patient progress and on communication between patient and therapist [1]. It has been introduced as policy in a number of jurisdictions including (prototypically) Australia [2] and New Zealand [3].

The statutory body for ensuring quality and regulation of mental health services in Ireland is the Mental Health Commission (MHCI). The MHCI issued the Quality Framework for Mental Health Services in Ireland in 2005. One of its eight key "themes" is "systematic evaluation and review of mental health services underpinned by best practice will enable providers to deliver quality services." Within this theme, the main "standard" is "the mental health service is delivered in accordance with evidence-based codes of practice, policies and protocols." A specific criterion of this standard is "The mental health service monitors its performance in relation to this standard as part of a quality improvement process" [4]. They have not outlined a specific policy for measurement of outcome in individual service users.

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HoNOS (The Health of The Nation Outcome Scales) [5] was developed, as a means to quantify outcomes in mental health. It was commissioned for this purpose as part of the implementation of the Health of the Nation strategy in 1991.

A number of other Irish studies have used HoNOS for research purposes [6, 7], but it has not yet to our knowledge entered routine use. This paper examines the routine use of HoNOS in an Irish mental healthcare context, which has previously been examined and shown to be feasible.

Aims

The aims of the study were (a) to investigate the relation of HoNOS with another outcome measure—the Global Assessment of Functioning (GAF), (b) to examine if there are changes (improvement or decline) of outcomes through the years 2014–2016 and (c) to investigate which factors contributed (diagnosis, demographics) to any decline or improvement of HoNOS.

Methods

The study took place in one sector of Sligo/Leitrim Mental Health Services (Sligo town community mental health team). This is a predominantly urban catchment area within a rural mental health service. Data from the outpatient clinic were routinely collected from the beginning of 2014 during each clinical contact (both new patient and return reviews). At each contact, HoNOS was completed by a consultant or registrar, who had received a brief training through vignettes and videos in order to increase the inter-rater reliability. Those data were stored in an Excel database. Data were extracted until June 2016. In a subsample, the GAF was also completed contemporaneously by the patient's responsible Community Psychiatric Nurse (CPN) who was blind to the HoNOS scores.

Data extracted

1. Demographics: gender, age. Age was calculated in whole years based on the date of assessment minus the date of birth.
2. Diagnosis: The diagnosis was made according to ICD-10 criteria. The main diagnoses were collapsed according to major diagnostic categories of ICD-10.
3. Health of the Nation Outcomes Scales (HoNOS). HoNOS was developed by the Royal College of Psychiatry's research unit. HoNOS consists of 12 clinician-rated scales each with a range of five points reflecting the severity of problems ranging from 0 (no problem) to 4 (a severe

problem). It is accompanied by a guide for clinicians with a glossary of item definitions and descriptions of degrees of severity. Eight of the scales are clinical and four of the scales are social. The scales cover behavioural disturbance, non-accidental self-injury, problem drinking or drug use, cognitive problems, problems related to physical illness or disability, hallucinations and delusions, depressive symptoms, other mental and behavioural symptoms, problems with relationships, problems with activities of daily living, problems with living conditions and problems with leisure activities. The HoNOS is a simple, brief and clinically acceptable instrument with good construct and predictive validity, adequate test–retest and inter-rater reliability and sensitivity to change [8]

4. Global Assessment of Functioning (GAF) [9] is a clinician-rated scale to rate the social, occupational and psychological functioning of an individual. Scores range from 1 (severely impaired) to 100 (high functioning). It has been shown that the GAF has good validity and inter-rater reliability [10]

Ethics

The project was approved by the Ethics Committee of Sligo University Hospital.

Data analysis

Data were extracted from the Excel database using Microsoft SQL Server 2008 R2 [11] and analysed with IBM SPSS v23 [12]. Descriptive statistics were presented as counts and proportions for categorical variables. Continuous data were presented as means and standard deviations (SDs). The agreement between HoNOS and GAF was examined by using Spearman's correlation rho. The generalised estimating equations method (GEE) was used to analyse longitudinal data. This method recognises that observations within a subject are correlated and estimates the population average across time. The estimated coefficients reflect the relationship between the longitudinal development of the dependent variable and the longitudinal development of the predictor variables, using all data. For GEE analysis, an exchangeable working correlation matrix structure was assumed, with link function identity.

The final, most parsimonious model was conducted by dropping non-significant variables sequentially as guided by the Corrected Quasi Likelihood under Independence Model Criterion (QICC.) In this instance, lower values represent better fit.

Results

Description of the sample (demographics and diagnostic categories)

Four hundred seventy outpatients completed 1125 HoNOS assessments during the study period. The total number of HoNOS assessments carried out on each participant ranged from 1 to 7. The mean age of the attendants at first HoNOS assessment was 43.12, SD 14.6 (minimum 18 maximum 83). Out of the 470 assessed, 220 (46.8%) were males. The main diagnostic categories according to ICD-10 are presented in Table 1. The category "others" includes four service users with diagnosis in the category F00–F09 (organic, including symptomatic, mental disorders), four in the category F90–F98 (behavioural and emotional disorders with onset usually occurring in childhood and adolescence), three with diagnosis in the category F70–F79 (mental retardation) and one in the category F80–F89 (disorders of psychological development).

Agreement between Global Assessment of Functioning and Health of the Nation Outcome Scales

In a consecutive subsample of 261 attendants, the agreement between HoNOS and GAF was examined. Given that the two variables were not normally distributed, Spearman's rho was used to measure the agreement. The correlation coefficient was rho = -0.919 and $p < 0.001$. Thus, the agreement was high (although negatively correlated) as high score in GAF indicates better functioning while in HoNOS, high scores indicate worse functioning.

Health of the Nation Outcome Scales

The means of each scale and HoNOS totals at each assessment are presented in Table 2. As can be seen from the table, the means of the total HoNOS declined over the course of sequential assessments (reflecting improvement). Table 3 shows the means and standard deviations of total HoNOS scores in each diagnostic category across the assessments as well as the number of service users in each diagnostic category.

We subsequently examined if this identified improvement is significant and which other factors (diagnostic categories, gender, age and number of assessments) are significantly associated with this decline of the HoNOS scores. For this longitudinal analysis, a GEE model was conducted with the total HoNOS score as dependent variable and as independent variables gender, age, diagnostic categories and number of assessments. This most parsimonious model is presented in Table 4. Lower (better outcomes) HoNOS scores were independently significantly associated with the number of assessments carried out on an individual (more visits to the outpatient clinics) and with a diagnosis inside the ICD-10 categories of F20–F29 (Schizophrenia, schizotypal and delusional disorders), F30–F39 (mood disorders), F40–F48 (neurotic, stress-related and somatoform disorders) and F50–F59 (behavioural disorders associated with physiological disturbances). Gender and age were not significantly associated with decline or improvement of HoNOS scores; neither were the rest of the diagnostic categories.

Discussion

This study confirms that HoNOS is a feasible instrument and can be potentially used in mental health services in Ireland as a routine outcome measurement. Two previous studies in Ireland in similar settings [13, 14] have also shown the same degree of feasibility and have also emphasised the brevity of the scales and ease with which they are scored. Our paper demonstrates this feasibility persists with increasing numbers of patients over a greater duration of time. Completion of HoNOS typically takes less than 2 min to complete as most of the scales included are typically covered during a normal clinical assessment. However, to increase inter-rater reliability, a brief training for clinicians completing ratings is required beforehand [15].

Table 1 Main diagnoses according to ICD-10

ICD-10	Frequency (n)	Percent (%)
F10–F19: Mental and behavioural disorders due to psychoactive substance use	50	10.6
F20–F29: Schizophrenia, schizotypal and delusional disorders	89	18.9
F30–F39: Mood affective: disorders	175	37.2
F40–F48: Neurotic, stress-related and somatoform disorders	118	25.1
F50–F59: Behavioural syndromes associated with physiological disturbances and physical factors	6	1.3
F60–F69: Disorders of adult personality and behaviour	20	4.3
Others: (F00–F09) + (F90–F98) + (F70–F79) + (F80–F89)	12	2.6
Total	470	100.0

Table 2 Means and standard deviations of HoNOS scales and total HoNOS at each assessment

Assessments

		1	2	3	4	5	6	7
Overactive, aggressive, disruptive or agitated behaviour	Mean	.16	.08	.11	.08	.08	.11	.36
	SD	.55	.36	.46	.34	.33	.39	.63
Non-accidental self-injury	Mean	.10	.06	.04	.05	.11	.00	.00
	SD	.49	.33	.22	.39	.63	.00	.00
Problem-drinking or drug taking	Mean	.42	.27	.30	.22	.13	.14	.07
	SD	.93	.77	.74	.61	.38	.42	.27
Cognitive problems	Mean	.25	.23	.23	.23	.29	.38	.36
	SD	.69	.66	.62	.57	.66	.76	.93
Physical illness or disability problems	Mean	.38	.29	.48	.30	.38	.38	.29
	SD	.93	.82	.94	.73	.81	.79	.73
Problems with hallucinations and delusions	Mean	.24	.16	.20	.16	.16	.24	.14
	SD	.74	.59	.67	.64	.63	.64	.53
Problems with depressed mood	Mean	.77	.58	.66	.54	.73	.65	.29
	SD	1.0	.85	.99	.87	.99	1.03	.61
Other mental and behavioural problems	Mean	.56	.48	.58	.62	.51	.62	.43
	SD	1.0	.90	.98	.99	.95	1.01	1.16
Problems with relationships	Mean	.51	.46	.40	.38	.27	.38	.14
	SD	.96	.92	.96	.87	.81	.79	.53
Problems with activities of daily living	Mean	.43	.38	.36	.25	.33	.27	.36
	SD	.92	1.03	.82	.65	.72	.65	.74
Problems with living conditions	Mean	.24	.15	.11	.14	.08	.00	.00
	SD	.72	.57	.47	.57	.37	.00	.00
Problem with occupation and activities	Mean	.35	.24	.30	.17	.27	.38	.29
	SD	.88	.89	.73	.54	.75	.79	.83
Total HoNOS	Mean	4.43	3.39	3.77	3.13	3.33	3.54	2.71
	SD	4.36	3.82	3.89	3.14	3.98	3.11	2.89
	Count	470	266	166	109	63	37	14

In addition, the results of our study show a very good correlation of total HoNOS with GAF scores. Similar strength of association has been reported by previous studies from other countries [16–18] as well as in an Irish sample [13].

Finally, we have demonstrated that two factors were significant with respect to longitudinal changes of total HoNOS scores; the number of assessments and the diagnosis.

Higher number of assessments (more visits in the outpatient clinics) was associated with better outcomes. This could be due to a more intensive treatment but may also be due to a biased "survival" effect. People with more severe mental illness may have had less assessments and higher initial scores in HoNOS. This is perhaps representative of an illness-related tendency towards missing or attending less outpatient clinic visits and a higher rate of loss to follow up [19].

Four diagnostic categories had significantly better outcomes: Schizophrenia, schizotypal and delusional disorders, affective disorders, neurotic, stress-related and somatoform disorders and eating disorders. Conversely, alcohol and psychoactive substance use-related disorders as well as personality disorders did not. This perhaps is due to service factors or service users' characteristics but most likely due to limitations of duration of study time. Service users with problems in these clusters of diagnoses require a long period of time to recover (if indeed recovery is achieved) with a propensity for relapses and drop outs during treatment [19]. The relatively short time frame of this study may not be able to capture any significant improvement in these groups. In previous studies as well as ours (Table 3), these two diagnostic categories also tend to have high initial HoNOS scores [20, 21], reflecting more complicated cases which may require more time to achieve recovery.

We did not find that gender had a significant effect on changes of HoNOS scores which was not unexpected based on previous studies [20]. We also did not find any significant effect of age on the HoNOS scores. Although this finding is consistent with previous studies [22], a more recent study [23]

Table 3 Means and standard deviations of total HoNOS in each diagnostic category across the assessments

		Assessments						
Diagnostic category		1	2	3	4	5	6	7
		HoNOS						
F10–F19	Mean	6.2	5.7	8.0	4.2	1.0	.	.
	SD	5.9	4.1	7.0	1.3	1.0	.	.
	Count	50	17	6	6	3	0	0
F20–F29	Mean	5.2	3.5	4.1	3.0	3.8	1.9	1.3
	SD	4.9	4.8	4.1	3.6	5.2	2.1	1.2
	Count	89	64	41	30	17	10	3
F30–F39	Mean	3.3	2.7	3.0	2.6	2.8	4.2	3.3
	SD	3.2	3.0	3.2	2.7	2.6	3.4	3.9
	Count	175	100	63	39	25	15	6
F40–F48	Mean	4.5	3.4	3.6	3.8	2.8	3.0	2.0
	SD	3.9	3.6	3.4	3.6	2.1	1.4	1.6
	Count	118	62	37	24	11	8	4
F50–F59	Mean	3.3	4.0	2.5	6.0	.	.	.
	SD	2.7	4.2	3.5	.	.	.	.
	Count	6	2	2	1	0	0	0
F60–F69	Mean	4.6	3.6	4.5	1.9	6.3	6.3	6.0
	SD	4.2	2.7	4.5	1.7	7.1	4.6	.
	Count	20	13	12	7	6	4	1
Others	Mean	8.7	6.4	5.6	6.5	4.0	.	.
	SD	6.2	4.6	5.1	3.5	.	.	.
	Count	12	8	5	2	1	0	0

involving 12 years follow up of service users with schizophrenia or delusional disorder did in fact show a significant effect of age on HoNOS scores. Hitherto, concerns about variation in HoNOS with respect to age [20] have been answered by the argument that high scoring in some individual HoNOS scales are associated with younger age and others are associated with older age. This argument contends that the resultant total score is thus not related to age.

However, these previous studies, including ours, may not have had follow-up for a sufficiently long time, meaning the demonstrated effect of age on HoNOS scores is inconclusive.

A limitation of our study may be the biased sample. We have collected data from only one Community Mental Health team (CMHT) and only from outpatient clinics where only doctors that have received training on HoNOS completion have completed the ratings. Although this procedure was followed to increase the inter-rater reliability, this may have introduced some bias in the sample presented here. This sample is however quite similar to previous studies in Ireland [13, 14].

Our aim was not necessarily to present the local outcomes but to emphasise again the need for establishing and mandating routine outcome measurements, and the feasibility of HoNOS for this purpose. This study adds some longitudinal data lacking in the previously mentioned studies.

It is rather surprising given a number of other Irish studies have used the HoNOS for research purposes [6, 7] or in the Irish clinical context [13, 14], and other international studies in routine outcome measurement have similarly indicated the feasibility of HoNOS, that there has been no move towards its specific mandated use in Ireland.

Research in other countries (mainly Australia, New Zealand and the UK) where HoNOS has been mandated has shown that there is a mixture of positive and negative attitudes of clinicians [24] towards HoNOS. Some have used the outcome data to provide better clinical practice and service [25] while others regard it as a bureaucratic exercise, which is onerous in its time demands, and have expressed fear of data generated by HoNOS being used as a means to justify service closures and job losses [26–28]. This is despite the evidence that the contrary is in fact true [29].

Table 4 Parameter estimates of the final GEE models showing the effects of significant variables on the HoNOS total

Parameter	B	Std. error	95% Wald confidence interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	7.988	1.4391	5.168	10.809	30.812	1	0.000
Number of assessments	− .340	0.0803	− .497	− 0.182	17.911	1	< 0.001
F10–F19	− 1.507	1.6030	− 4.649	1.635	0.884	1	0.347
F20–F29	− 3.209	1.4815	− 6.113	− 0.305	4.692	1	0.030
F30–F39	− 4.371	1.4371	− 7.187	− 1.554	9.250	1	0.002
F40–F49	− 3.476	1.4518	− 6.321	− 0.630	5.731	1	0.017
F50–F59	− 3.875	1.7457	− 7.297	− 0.454	4.928	1	0.026
F60–F69	− 2.903	1.5547	− 5.950	0.144	3.486	1	0.062
Others	0	–	–	–	–	–	–

The sign (+ or −) in front of the estimates (B) shows the direction of the relationship with the dependent variable, e.g., the minus (−) in front of the B for number of assessments, means that higher number of assessments lower HoNOS scores (belter outcomes)

However, the unanimous agreement in these domains has been that training and support to understand the meaning and possible use of outcome measurements is essential [30–32]. A recent review of outcomes measurement, particularly in psychotherapy, concludes that feedback of outcomes measurement data is necessary to increase clinical effectiveness, to correctly identify patients at risk of relapse and to help in decision-making [33]. Concerns have however been expressed about the manner of implementation of routine measurement without such feedback and the way in which data generated is used [34].

In conclusion, the results of the present study support the utility and feasibility of HoNOS as a routine measurement of clinical outcomes and give further evidence for the need of implementation of routine outcome measurements in Mental Health Services in Ireland. However, more challenges remain including defining the optimum manner in which it may be used widely in services and in other disciplines. Determining how to couple it with other service user-rated measures is another important challenge.

Compliance with ethical standards

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